AKSENOV, V.V., inzhener.

Over-all mechanization of the production of window sashes and door leaves. Gor.khoz.Mosk. 30 no.5:29-31 My '56. (MLRA 9:8)
(Woodworking machinery)

KHRULEV, Valentin Mikhaylovich; FREYDIN, Anatoliy Semenovich; BELOZEROVA, Anastasiya Sergeyevna; AKSENOV, Viktor Vasil'yevich; GUBENKO, A.B., doktor tekhn. nauk, red.; AZAROVA, V.G., red. izd-va; PARAKHINA, N.L., tekhn. red.

[Wood gluing in foreign countries] Skleivanie drevesiny za rubezhom. By V.M.Khrulev i dr. Moskva, Goslesbumizdat, 1961. 301 p.

(MIRA 14:11)

(Woodwork)

TERPIGOREV, A.M., akademik; SPIVAKOVSKIY, A.O.; AKSENOV, V.V., kand.tekhn.nauk

Prospects for speeding up stoping in longwalls. Ugol' 33 no.11:24-30 N '58. (MIRA 11:11)

1. Chlen-korrespondent AN SSSR (for Spivakovskiy).
(Stoping (Mining))

L 8501-66

ACC NR: AP5028549 SOURCE CODE: UR/0286/65/000/020/0162/0163

37

B

AUTHORS: Lazarev, V. N.; Minayev, I. I.; Aksenov, V. V.

ORG: none

TITLE: A vibration method for determining the surface of a liquid. Class 42, No. 148544

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 20, 1965, 162-163

TOPIC TAGS: vibration effect, vibrator, vibration, liquid level indicator, liquid level instrument

ABSTRACT: This Author Certificate presents a method for locating the level of a liquid. To increase the accuracy of level location, a vibrator is placed in the liquid. A vibration receiver in close proximity to the vibrator is excited only when the space between the vibrator and the receiver is filled with liquid.

SUB CODE: 14/ SUBM DATE: 29Sep61

BVK

Card 1/1

2

PANASENKO, S.I., inzh.; SHCHERBINA, E.G., inzh.; AKSENOV, V.V., kand.tekhn. nauk; D'YAKONOV, D.M., inzh.; MIRONOV, N.T., inzh.

Testing experimental sections of the support of the AKD unit. Ugol'. prom. no.6:54-57 N-D '62. (MIRA 16:2)

1. Toretskiy mashinostroitel'nyy zavod (for Panasenko, Shcherbina).
2. Institut gornogo dela im. Skochinskogo (for Aksenov, D'yakonov, Mironov).

(Mine timbering--Testing)

L 13110-66 EWT(m)/ETC(F)/EWG(m)/EWP(t)/EWP(b) IJP(c) RDW/JD

ACC NR: AP5025784 SOURCE CODE: UR/0363/65/001/009/1502/1505

AUTHOR: Kharakhorin, F. F.; Gambarova, D. A.; Aksenov, V. V.

39

B

ORG: none

TITLE: Diffusion and solubility of gold in lead selenide

SOURCE: AN SSSR. Izvestiya. Neorganicheskiye materialy, v. 1, no. 9, 1965, 1502-1505

TOPIC TAGS: gold, lead compound, selenide, metal diffusion, solubility

ABSTRACT: Gold labeled with Au^{198} was deposited chemically on p-type lead selenide, and the samples were subjected to diffusion annealing at 300-500°C for 15 min to 20 hr. The distribution of gold was then determined by recording the gamma radiation of successively removed layers. The temperature dependence of the diffusion coefficient followed the equation

$$D = 5.6 \cdot 10^{-2} \exp\left(\frac{0.75}{kT}\right) \mathrm{cm}^2/\mathrm{sec}$$

The temperature dependence of the solubility of gold in lead selenide was also determined. Solubility increases with temperature in the 350--600°C range. Above 650°C, the intermediate phase Au_2Pb is formed. As

UDC: 546.817'231:546.59

Card 1/2

L 11109-66 EWT(m)/ETC(F)/EWG(m)/T/EWP(t)/EWP(b)/...

ACC NR: AP5025785 SOURCE CODE: UR/0363/65/001/009/1506/1507

AUTHOR: Kharakhorin, F. F.; Gambarova, D. A.; Aksenov, V. V.

ORG: none

49 B

TITLE: Diffusion of tin in lead selenide

SOURCE: AN SSSR. Izvestiya. Neorganicheskiye materialy, v. 1, no. 9, 1965, 1506-1507

TOPIC TAGS: metal diffusion, tin, lead compound, selenide, single crystal, electrodeposition

ABSTRACT: Tin labeled with $Sn^{113+123}$ was electrodeposited on *n*-type lead selenide single crystals. Diffusion annealing lasting from 0.5 to 37 hr was carried out at 510-880°C in quartz ampoules filled with argon at 0.5 atm. Layers from 10 to 50 μ thick were then removed and their radioactivity was determined. The diffusion coefficients are given by the equation

$$D = 1{,}2 \cdot 10^{-6} \exp\left(-\frac{0{,}81}{kT}\right), \text{ cm}^2/\text{sec}$$

Their values ranged from $5.5 \cdot 10^{-12}$ to $3.4 \cdot 10^{-10}$ cm^2/sec in the tempera-

UDC: 546.817'231:546.811-121

Card 1/2

2

L 13109-66

ACC NR: AP5025785

ture range studied. It is postulated that the diffusion takes place in lead vacancies. Orig. art. has: 2 figures, 1 formula.

SUB CODE: 07/ SUBM DATE: 15May65/ ORIG REF: 002/ OTH REF: 000

Card 2/2

L 12741-66 EWT(m)/ETC(f)/EWG(m)/EWP(t)/EWP(b) IJP(c) RDW/JD

ACC NR: AP5000842 SOURCE CODE: UR/0181/65/007/012/3481/3484

AUTHORS: Kharakhorin, F. F.; Gambarova, D. A.; Aksenov, V. V.

47

ORG: None

TITLE: Diffusion and solubility of copper in lead selenide

SOURCE: Fizika tverdogo tela, v. 7, no. 12, 1965, 3481-3484

TOPIC TAGS: physical diffusion, copper, lead compound, single crystal, selenide, semiconductor conductivity, solubility

ABSTRACT: This is part of a systematic investigation of diffusion and the solubility of impurities in chalcogenides of lead. The article reports the results of the behavior of copper in single-crystal lead selenide at temperatures 93 -- 520C. The tests were made on lead selenide previously synthesized by the Bridgman-Stockbarger method in quartz ampoules of special shape. The single crystals were grown 11 -- 15 mm in diameter and up to 60 mm long. The crystals were cut perpendicular to the generatrix into discs 1 -- 2 mm thick. The measured samples were of the n-type conductivity with specific resistivity $\sim 4 \times 10^{-3}$ ohm-cm and carrier density $\sim 4 \times 10^{18}$ cm^{-3}. The diffusion coeffi-

Card 1/2

L 12741-66

ACC NR: AP5000842

cients were determined with the aid of radioactive Cu^{64} by successive removal of layers. The results show that at 93 -- 520C the diffusion obeys the equation $B = 2 \times 10^{-5} \exp(-0.31/kT)$ cm^2/sec, and apparently occurs in the interstices. The solubility has a retrograde character with a maximum value of 9×10^{18} at/cm^3 at ~800C. The interstitial character of the diffusion is deduced from the large diffusion rate, the low activation energy (0.31 ev). Orig. art. has: 3 figures and 1 formula.

SUB CODE: 20/ SUBM DATE: 01Apr65/ ORIG REF: 006/ OTH REF: 011

FW

Card 2/2

AKSENOV, V.V., kand. tekhn. nauk, nauchnyy rukovoditel'; D'YAKONOV, D.N., inzh.; MIRONOV, N.T., inzh.; YAKOVLEVA, L.A., red.; GERASIMOV, V.F., tekhnolog

[Optimum parameters of a system of working steep seams with stoping machinery and the efficiency of mechanized mining] Optimal'nye parametry sistemy razrabotki krutykh plastov ochistnymi agregatami i effektivnost' agregatnoi vyemki; kratkii nauchnyi otchet. Moskva, AN SSSR, 1963. 46 p. (MIRA 16:10)

1. Akademiya nauk SSSR. Laboratoriya podzemnoy razrabotki ugol'nykh mestorozhdeniy.
(Donets Basin--Coal mines and mining)

AKSENOV, V.V., kand. tekhn. nauk; SHALKOV, A.V., inzh.; DOLGOV, ~~E.P.,~~ inzh.; KAMNEVA, T.N., red.; GERASIMOV, V.F., tekhnolog-red.

[New electric devices for studying mining machines] Novye elektricheskie pribory dlia issledovaniia gornykh mashin; kratkii nauchnyi otchet. Moskva, In-t gornogo dela, 1963. 41 p. (MIRA 16:10)

(Mining machinery--Testing)
(Electric apparatus and appliances)

AKSENOV, V.V.; MIRONOV, N.T.; PETROSYANTS, E.V.; CHERKASHENINOV, V.I.

Results of the mine testing of M52 powered supports as part of an A2 stoping unit. Fiz. mekh. svois., dav. i razr. gor. porod. no.2: 175-185 '63. (MIRA 17:1)

L 09067-67 EWT(m)/EWP(t)/ETI IJP(c) JD

ACC NR: AP6023914 SOURCE CODE: UR/0363/66/002/007/1200/1205

AUTHOR: Kharakhorin, F. F.; Aksenov, V. V.; Gambarova, D. A.; Khrustalev, B. P.; Kul'bich, R. K.

17

ORG: none

TITLE: On the mechanism of change of the conduction sign during heat treatment of n-InSb /Paper presented at the All-Union Conference on Diffusion in Semiconductors held in Leningrad on 2 December 1964/

SOURCE: AN SSSR. Izv. Neorg materialy, v. 2, no. 7, 1966, 1200-1205

TOPIC TAGS: indium compound, antimonide, semiconductor conductivity

ABSTRACT: An attempt was made to identify the impurities in InSb on the basis of their characteristic emissions and half-lives following heat treatment of InSb in quartz ampoules activated by a flux of slow neutrons ($0.9-2.4 \times 10^{13}$ n/cm^2 sec) in an atomic pile. It was shown by the gamma-spectroscopic method that the radioactive impurities Na^{24}, Cu^{64} and Si^{31} migrated from the neutron-activated quartz into n-InSb. The experimental data indicate that the chief cause of the change of the conduction sign during heat treatment of n-InSb is the diffusion of copper. It was shown that vacuum annealing of the ampoules prior to the activation decreases the activity of the N-InSb samples by a factor of 20 to 60. Authors thank L. A. Bovina, M. F. Poluboyarinova and V. G. Vinogradova for their assistance. Orig. art. has: 6 figures and 2 tables.

SUB CODE: 20/ SUBM DATE: 27Oct65/ ORIG REF: 009/ OTH REF: 001

Card 1/1 nst UDC: 546.682'861:537.31133

KAZANSKIY, A., inzh.-polkovnik; AKSENOV, Ya., inzh.-podpolkovnik; TRUSHIN, A., inzh.

Mobile tubular steam boiler. Tyl i snab. Sov. Voor. Sil 21 no.10:88-89 O '61. (MIRA 15:1)

(Boilers)

AKSENOV, Ya., inzhener-podpolkovnik; KOVALENKO, V., starshiy inzhener-leytenant; TRUSHIN, A., inzh.

A means of pumping over viscous petroleum products. Tekh. i vooruzh. no.2:23-25 F '64. (MIRA 17:9)

AKSENOV, Ya.V.; KOGAN, V.B.; KUROCHKIN, A.P.; LIND, A.B.

Device for selective sorting of plunger-pair parts. Izm. tekh. no. 3:7-8 Mr '61. (MIRA 14:2)
(Photoelectric measurements)

AKSENOV, Ya.V.; YEGOROV, M.G.; KOCHKIN, P.I.

Newly designed steam heaters for tanks. Mash. i neft. obor. no.7:11-12 '63.
(MIRA 17:1)

AKSENOV, Ye.; VASIL'YEV, A.; NIKIFOROV, V.; PIMENOV, M.; SHADURSKIY, P.

"Peat semibriquet" by [inzh.] D.I.Shukhman. Reviewed by E.Aksenov and others. Torf.prom. 39 no.3:39-40 '62. (MIRA 15:4)
(Briquets (Fuel)) (Shukhman, D.I.)

AKSENOV, Yevgeniy Afanas'yevich, inzh.; KOTOV, Aleksey Nikolayevich, inzh.

Alliance between figures and electrons controls a cutting machines. IUn.tekh. 4 no.2:24-26 F '60. (MIRA 13:6)

(Milling machines--Numerical control)

AKSENOV, Ye. A.

"The Peat Industry in White Russia (SSR) and the Prospects of Its Development," Sbor. Nauch Trud. Inst. Torfa AN BSSR, No.1, 1951

AKSENOV, Ye.A., dotsent

Problems in the improvement of technological process in the peat industry. Sbor.nauch.trud.Bel.politekh.inst. no.66:198-207 '57. (MIRA 16:9)

NIKIFOROV, Valerian Aleksandrovich; AKSENOV, Ye.A., red.; STEPANOVA, N., tekhn.red.

[Manual for the peat industry worker] Spravochnik rabotnika torfianoi promyshlennosti. Minsk, Gos. izd-vo BSSR, Red. nauchno-tekhn.lit-ry, 1958. 350 p. (MIRA 11:12)

(Peat industry)

AKSENOV, Ye.A.

Preparation of milled fields by deep plowing. Sbor.nauch. trud.Bel.politekh.inst. no.65:11-31 '59. (MIRA 13:5)
(Peat industry)

AKSENOV, Ye.A.

Bog development operations and their effect on the quality of part fuel. Sbor. nauch. trud. Bel. politekh. inst. no.88:3-14 '60. (MIRA 14:12)

(Peat bogs)

VARENTSOV, Vladimir Semenovich, dots.; LAZAREV, Aleksandr Vasil'yevich, dots.; BRAGIN, N.A., inzh., retsenzent; ~~AKSENOV, Ye.A.,~~ dots., retsenzent; VASIL'YEV, A.M., dots., retsenzent; NIKIFOROV, V.A., dots., retsenzent; PIMENOV, M.P., dots., retsenzent; SHADURSKIY, P.A., dots., retsenzent; SEMENSKIY, Ye.P., dots., retsenzent; FRIDKIN, L.M., tekhn. red.

[Technology of the production of milled peat]Tekhnologiia proizvodstva frezernogo torfa. Moskva, Gosenergoizdat, 1962. 335 p. (MIRA 15:12)

1. Kalininskiy torfyanoy institut (for Varentsov, Lazarev). 2. Belorusskiy politekhnicheskiy institut (for Aksenov, Vasil'yev, Nikiforov, Pimenov, Shadurskiy).

(Peat)

AKSENOV, Ye.A., glav. red; LAGUTO, L.D., red.; SHUKHMAN, D.I., red.; LYUDCHIK, K.F., red.; OSADCHIY, Ye.A., red.

[Production of peat briquets and semibriquets; exchange of technical-production experience] Proizvodstvo torfianykh briketov i polubriketov; obmen proizvodstvenno-tekhnicheskim opytom. Minsk, Izd. red.-izd. otdela In-ta nauchno-tekhn. informatsii i propagandy Goskomiteta Soveta Ministrov BSSR po koordinatsii nauchno-issl. rabot, 1962. 79 p. (MIRA 17:11)

1. Vsesoyuznoye nauchno-tekhnicheskoye obshchestvo energeticheskoy promyshlennosti. Belorusskoye respublikanskoye otdeleniye.

GOL'DSHTEYN, Samuil Mendelevich; PEKELIS, Grigoriy Borisovich;
AKSENOV, Ye.A., dots., nauchn. red.

[Use of peat in electric power engineering] Ispol'zovanie torfa v elektroenergetike. Minsk, Nauka i tekhnika, 1964. 106 p. (MIRA 18:5)

AKSENOV, Ye.P.; GREBENIKOV, Ye.A.; DEMIN, V.G.

Generalized problem of two fixed centers and its application to the theory of motion of artificial earth satellites. Astron.zhur. 40 no.2:363-372 Mr-Ap '63. (MIRA 16:3)

1. Gosudarstvennyy astronomicheskiy institut im. P.K.Shternberga.
(Artificial satellites--Orbits)

REYNOV, Mikhail Naumovich; BREGMAN, Vladimir Il'ich; MOSKALENKO, Vladimir Mikhaylovich; NAKHIMOVICH, Eduard Mikhaylovich; PETROV, Yevgeniy Yuvenal'yevich; MOSHENSKIY, Naum L'vovich; AKSENOV, Yevgeniy Mikhaylovich; ROMANOV, B.N., inzh., retsenzent; SHAKHNOVA, V.M., red.; FRUMKIN, P.S., tekhn.red.

[Shipbuilding calculations on electronic computers] Sudostroitel'nye raschety na elektronnykh vychislitel'nykh mashinakh. [By] M.N.Reinov i dr. Leningrad, "Sudostroenie," 1964. 169 p. (MIRA 17:3)

24.4200
3.2200

83935
S/188/60/000/004/011/014
B005/B060

AUTHOR: Aksenov, Ye. P.

TITLE: Periodic Motions of a Particle in the Gravitational Field of a Rotating Body

PERIODICAL: Vestnik Moskovskogo universiteta. Seriya 3, fizika, astronomiya, 1960, No. 4, pp. 86-95

TEXT: The author of the present paper, in connection with the study of artificial satellites at a short distance from the Earth, studied the motions of a particle in the gravitational field of an arbitrary solid body. A brief introduction contains a list of publications dealing with the problem discussed here. A. A. Orlov (Ref. 2), G. N. Duboshin (Ref. 3), Yu. V. Batrakov (Ref. 4), and I. D. Zhongolovich (Ref. 5) are mentioned. The investigations were made on the assumption of the attracting body rotating uniformly round one of its main central axes of inertia. The main central axes of inertia of the body were taken to be the axes of the coordinate system required for the calculations. The

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83835

Periodic Motions of a Particle in the Gravitational Field of a Rotating Body

S/188/60/000/004/011/014
B005/B060

SUBMITTED: April 29, 1960.

Card 3/3

86281
S/188/60/000/005/010/010
B019/B056

24.4200

AUTHOR: Aksenov, Ye. P.

TITLE: The Almost Circular Motion of a Particle in the Gravitational Field of a Rotating Body

PERIODICAL: Vestnik Moskovskogo universiteta. Seriya 3, fizika, astronomiya, 1960, No. 5, pp. 94 - 102

TEXT: The problem of the motion of a particle under the action of the attractive force of a solid is studied. The solid rotates uniformly round one of its principal axes of inertia. It is assumed that the gravitating body has dynamic symmetry with respect to the three principal cross sections of its inertia ellipsoid. The equation of motion for a point P in the gravitational field produced by this rotating body is set up. First, the existence of periodic solutions to this equation of motions is proved, after which the first terms of the solutions obtained by series expansion are studied. The conditions are found under which the solutions converge, and it is shown that the radius of convergence depends on the characteristic of the gravitating body. The less the gravitating

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The Almost Circular Motion of a Particle in the Gravitational Field of a Rotating Body

86281
S/188/60/000/005/010/010
B019/B056

body differs from a sphere, the more does its radius of convergence extend. There are 4 references: 3 Soviet and 1 US.

ASSOCIATION: Kafedra nebesnoy mekhaniki i gravimetrii (Department of Celestial Mechanics and Gravimetry)

SUBMITTED: June 29, 1960

Card 2/2

20338

3,2200

S/188/60/000/006/011/011
B101/B204

AUTHORS: Demin, V. G., Aksenov, Ye. P.

TITLE: The periodic motions of a particle in the gravitational field of a slowly rotating body

PERIODICAL: Vestnik Moskovskogo universiteta. Seriya 3, fizika, astronomiya, no. 6, 1960, 87-92

TEXT: The following problem is dealt with. A material point moves in the gravitational field of a solid, which rotates slowly round one of its inertial main axes and has dynamic symmetry with respect to the plane passing perpendicularly to the rotation axis through the center of mass. For the gravitational potential of the body, in the system of coordinates Oxyz with origin in the center of mass of the body, direction of axis agreeing with the inertial main axis, is written down:

$U = (fM/r)\left\{1 + \sum_{k=2}^{\infty}(d/r)^k\left[P_k(x,y,z)/r^k\right]\right\}$ (1), where f is the gravitational constant, M the mass, $r = \sqrt{x^2 + y^2 + z^2}$, d is the radius vector of the

Card 1/5

most remote point of the body, $Q_k(x,y,z)$ homogeneous harmonic polynomials of k-th order with respect to x, y, z. If m is the angular velocity of the rotation of the body round the Oz axis, the differential equations for the motion of point P are:

$d^2x/dt^2 - 2m\,dy/dt - m^2x = \partial U/\partial x$; $d^2y/dt^2 + 2m\,dx/dt - m^2y = \partial U/\partial y$;

$d^2z/dt^2 = \partial U/\partial z$ (3). The motions of P in the plane z=0 are investigated, the variables ξ,η are introduced ($x = b\xi$, $y = b\eta$), and furthermore $m = \nu\alpha$, $(d/b)^k = \gamma\alpha^{k-1}$ (ν,γ = const) is put, and the following equations are obtained: $d^2\xi/dt^2 - 2\alpha\nu\, d\eta/dt - \alpha^2\nu^2\xi = \partial\overline{V}/\partial\xi$; $d^2\eta/dt^2 + 2\alpha\nu\, d\xi/dt - \alpha^2\nu^2\eta = \partial\overline{V}/\partial\eta$; where $\overline{V} = (k^2/\varrho)\left\{1 + \gamma\sum_{k=2}^{\infty}\alpha^{k-1}\left[\overline{Q}_k(\xi,\eta)/\varrho^{2k}\right]\right\}$.

For the required functions u and v with the independent variables τ, $\xi = \mathrm{ch}\,v\cos u - 1$; $\eta = \mathrm{sh}\,v\sin u$; $dt = (\mathrm{ch}^2v - \cos^2u)d\tau$ is written down. Herefrom result the equations of motions $u'' = 2\alpha\nu I v' + W'_u$;

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The periodic motions...

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B101/B204

$v'' = -2\alpha\nu I u' + W_v$ (5), where $W = k^2(\mathrm{ch}\, v + \cos u) + 0.5h(\mathrm{ch}\, 2v - \cos 2u) + (\alpha^2\nu^2/2)(\mathrm{ch}\, v - \cos u)^2 + I\overline{W}$; $I = \mathrm{ch}^2 v - \cos^2 u$,

$\overline{W} = k^2\gamma\sum_{k=2}^{\infty}\alpha^{k-1}\left[\overline{Q}_k(u,v)/Q^{2k+1}\right]$; $Q = \mathrm{ch}\, v - \cos u$. With $\alpha = 0$,

$u''_o = -k^2\sin u_o + h\sin 2u_o$; $v''_o = k^2\,\mathrm{sh}\, v_o + h\,\mathrm{sh}\, 2v_o$ (h = constant of the Jacobi's integrals). These equations give the solution v_o = const; $u_o = 2\arctan\left[\mathrm{cth}(v_o/2)\tan\sigma\tau\right]$; where v_o satisfies the equation $\mathrm{ch}\, v_o = -k^2/2h$; and $\sigma^2 = k^2\mathrm{sh}^2 v_o/4\mathrm{ch}\, v_o$. To this solution corresponds a motion of the point on an elliptical orbit whose major semiaxis equals $\mathrm{ch}\, v_o$, whose eccentricity equals $-1/\mathrm{ch}\, v_o$. One finds:
$\cos u_o = (\mathrm{ch}\, v_o\cos 2\sigma\tau - 1)/(\mathrm{ch}\, v_o - \cos 2\sigma\tau)$; $\sin u_o = \mathrm{sh}\, v_o\sin 2\sigma\tau/(\mathrm{sh}\, v_o - \sin 2\sigma\tau)$; $u'_o = 2\,\mathrm{sh}\, v_o/(\mathrm{ch}\, v_o - \cos 2\sigma\tau)$ (7). $u = u_o + \bar{u}$;

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The periodic motions... S/188/60/000/006/011/011
B101/B204

$v = v_o + \bar{v}$ is put and for the differential equation one writes down $\bar{u}'' = f(\bar{u},\bar{v},\bar{u}', \bar{v}',\tau,\alpha)$; $\bar{v}'' = \varphi(\bar{u},\bar{v},\bar{u}',\bar{v}',\tau,\alpha)$ (8). The functions f and φ are periodic with respect to τ with the period $T = 2\pi/\sigma$. Therefore, it is possible to apply the theorem of Poincaré to (8), and the solutions of the equations (8) are found by means of power series of the small parameter α. The following solution is given: $v_1 = \beta_1 \cos\omega\tau + \beta_2 \sin\omega\tau + F(\tau)$; $u_1 = u_o' \int (1/u_o'^2)\left\{\int u_o'(\partial\bar{W}_1/\partial u)d\tau + \beta_3\right\} d\tau + \beta_4 u_o'$ (10), where β_1, β_2, β_3, β_4 are arbitrary constants, $\omega^2 = k^2 sh^2 v_o / ch\, v_o$. In consideration of (6) one puts $u_1 = u_o'(1 + 2ch^2 v_o)\beta_3 \tau / 8\sigma^2 sh^2 v_o + \Phi(\tau)$ (11). $F(\tau)$ and $\Phi(\tau)$ are periodic functions of τ with the period T. The result is formulated as a theorem:

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The periodic motions...

20338
S/188/60/000/006/011/011
B101/B204

Nearly all generating periodic elliptical orbits satisfying the conditions $a = b \operatorname{ch} v_0 > a_0$; $0 < e_0 < e = 1/\operatorname{ch} v_0 < 1$; $\omega = (s\pi/2)$, $(s = 0, 1, 2, 3)$; $i = 0$; $-\infty < t_0 < +\infty$; where a is the major semiaxis, e the eccentricity, ω the angular distance of the pericenter, i the inclination of the orbits towards the equatorial plane, t_0 the instant of the passage through the pericenter, a_0, e_0 certain constants, correspond to nearly periodic orbits with three periods. In the equatorial plane of the attractive body with dynamic symmetry with respect to the rotation axis and the plane which is perpendicular hereto, and which passes through the center of mass, almost all motions are nearly elliptical with the possible exception of motions in too close proximity of the body. There are 2 references: 1 Soviet-bloc and 1 non-Soviet-bloc.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet, Kafedra nebesnoy mekhaniki i gravimetrii (Moscow State University, Department of Celestial Mechanics and Gravimetry)

SUBMITTED: July 4, 1960

Card 5/5

AKSENOV, Ye.P.

Libration points in the gravitational field of a rotating body.
Soob.GAISH no.115:44-53 '60. (MIRA 14:3)
(Gravitation)

S/035/61/000/007/013/021
A001/A101

3,2200

AUTHORS: Aksenov, Ye.P., Demin, V.G.

TITLE: On periodic orbits of an artificial satellite of the Moon

PERIODICAL: Referativnyy zhurnal. Astronomiya i Geodeziya, no. 7, 1961, 7-8, abstract 7A74 ("Byul. In-ta teor. astron. AN SSSR", 1960, v. 7, no. 10, 828 - 832)

TEXT: The authors consider the motion of an artificial lunar satellite taking into account perturbations from the Earth and the shape of the Moon. Using Poincaré's method, they prove the existence of periodic orbits close to circular ones. A particular example of such a periodic orbit is presented. Data on the lunar shape given by Tisserand (1891) were used in calculations. The circle of radius a = 2,250 km was taken as a generating orbit. It can be seen from this example, that perturbations from the lunar shape should be taken into consideration in determining the orbits of lunar satellites sufficiently close to the Moon (There is an important misprint in the article . Numerical values of co-

Card 1/2

24303

S/035/61/000/007/012/021
A001/A101

3.2200

AUTHOR: Aksenov, Ye.P.

TITLE: On the motion of an artificial satellite in the Earth's non-central gravitational field

PERIODICAL: Referativnyy zhurnal. Astronomiya i Geodeziya, no. 7, 1961, 7, abstract 7A73 ("Byul. In-ta teor. astron. AN SSSR", 1960, v. 7, no. 10, 850 - 858)

TEXT: The author derives inequalities in the motion of the Earth's artificial satellites which are due to tri-axiality of the Earth. The Earth's gravitational potential is assumed in the form of a series of spherical functions, which does not necessitate any restrictions in the shape and inner structure of the planet. The terms in this expansion are retained which do not depend on Earth's moments of inertia higher than of the second order. The unperturbed true anomaly is taken as an independent variable. In conclusion the author cites a numerical example which shows the following: if ellipticity of the Earth's equa-

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DEMIN, V.G.; AKSENOV, Ye.P.

Periodic motion of a particle in the gravitational field of a slowly rotating body. Vest. Mosk. un. Ser. 3: Fiz., astron. 15 no. 6:87-92 N-D '60. (MIRA 14:5)

1. Kafedra nebesnoy mekhaniki i gravimetrii Moskovskogo gosudarstvennogo universiteta.
(Gravitation)

AKSENOV, Ye. P. Cand. Phys-Math. Sci. (diss) "Influence of Tri-axiality and Heterogeneity of the Earth on the Movement of an Artificial Satellite", Moscow, 1961. 6 pp. (Moscow State Univ., State Astron. Institute im. P. K. Shternberg) 200 copies (KL Supp 12-61, 249).

26815

3.2200 2412 4512 1121 1132 S/560/61/000/008/004/010
E032/E514

AUTHORS: Aksenov, Ye. P., Grebenikov, Ye. A. and Demin, V. G.

TITLE: General solution for the motion of an artificial satellite in the normal gravitational field of the Earth

PERIODICAL: Akademiya nauk SSSR, Iskusstvennyye sputniki zemli, 1961, No.8, pp.64-71

TEXT: In the majority of papers concerned with the motion of artificial earth satellites, the problem is treated analytically with the aid of various series and successive approximations leading to the final solution of the differential equations of motion. There is then the attendant problem of the convergence of the series which is often ignored. Papers in which convergence problems are discussed are those of A. M. Lyapunov (Ref.1: Sobraniye sochineniy, Vol.1, Izd-vo AN SSSR, 1954), A. Wintner (Ref.2: Math. Zsf. 24, 259, 1926), G. A. Merman (Ref.3: Byull. ITA, 7, L., izd-vo AN SSSR, 1959, p.441) and M. S. Petrovskaya (Ref.4: Byull. ITA, 7, L, izd-vo AN SSSR, 1959, p.441). These workers were concerned with the convergence of Hill's series representing the

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motion of the Moon. A further problem which appears to be unresolved is that of whether the secular and mixed terms are due to the shortcomings of the particular method employed or whether they are inherent in the problem. Finally, it is very difficult to develop a quantitative theory by these methods. It is, therefore, very important to derive a general and also practically convenient solution of the problem. J. P. Vinti (Ref.5: J.Res.of Nat.Bur. Stand.Math. and Math.Phys., 62B, No.2, 79, 1959) and M. D. Kislik (Ref.6: Sb. Iskusstvennyye sputniki Zemli, No.4, Izd-vo AN SSSR, 1960, p.3) used the Hamilton-Jacobi method to solve the problem of the artificial earth satellite in quadratures. As Kislik has pointed out, the general solution, even if it is in a very unwieldy form, turns out to be more convenient for use with computers than numerical integration of the differential equations of motion. The amount of computer time taken up by numerical integration of differential equations is very much greater than the time necessary in the case of quadratures. Moreover, the Hamilton-Jacobi method leads to complicated elliptic quadratures which means that the quantitative analysis is difficult to accomplish. The present authors point out that the general solution of the problem can also be obtained on the basis of a certain analogy with the problem of two fixed gravitating centres. If one considers the motion of a mass point in the gravitational field of two fixed centres having equal masses, which are at a complex distance from each other, then the force function for the problem, when the complex distance is suitably chosen, can be made to approximate the real potential of the Earth. The introduction of the complex distance is due to the fact that at least the first few terms in the expansion of the Earth's potential in terms of the Legendre polynomials have alternating signs. It is pointed out that if all the coefficients of the Legendre polynomials were positive, then the satellite problem would be analogous to the classical problem of two fixed centres. If, on the other hand, all the coefficients except the first were negative, then the satellite problem could be solved with the aid of the solution for the case of three fixed centres, one of which attracts and the other two repel. The above scheme has been found by the present authors to be suitable for the solution of the Earth's satellite problem without taking into account atmospheric resistance. It is shown that the problem can

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be reduced to the following elliptic integrals:

$$\int \frac{d\mu}{\sqrt{2h\mu^4 + 2(c_2 - h)\mu^2 - (2c_2 + c_1^2)}} = \tau + c_3, \qquad (31)$$

$$\int \frac{d\lambda}{\sqrt{- 2h\lambda^4 - \frac{2fM}{c^3}\lambda^3 + 2(c_2 - h)\lambda^2 - \frac{2fM}{c^3}\lambda + (2c_2 + c_1^2)}} = \tau + c_4 \qquad (32)$$

where the independent variable t is given by

$$t = -\int (\lambda^2 + \mu^2)d\tau \qquad (34)$$

and h, c_1, c_2, c_3, c_4, c_5 are arbitrary constants. The cartesian geocentric coordinates of the satellite are then given

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by:

$$x = c\sqrt{(1+\lambda^2)(1-\mu^2)}\cdot\sin w,$$
$$y = c\sqrt{(1+\lambda^2)(1-\mu^2)}\cdot\cos w; \qquad (35)$$
$$z = -c\lambda\mu.$$

where w is given by

$$w = c_1\int\frac{(\lambda^2+\mu^2)d\tau}{(1-\mu^2)(1+\lambda^2)} + c_5. \qquad (33)$$

A detailed analysis of these results, i.e. the determination of the possible regions of motion, the nature of the secular and mixed terms, stability problems etc., will be given in a future publication. Acknowledgments are expressed to Professor G. N. Duboshin for advice and suggestions. There are 10 references: 6 Soviet and 4 non-Soviet. The two English-language references not mentioned in the text reading as follows:

J. A. O'Keefe, E. Eckels, R.K. Squires. Astr.J., 64, 820, 1959;
P. Herget, P. Musen. Astr. J., 63, 430, 1958.

SUBMITTED: November 22, 1960

Card 5/5

20883

S/033/61/038/002/007/011
E032/E414

3,1400 (1041, 1080, 1109)

AUTHOR: Aksenov, Ye.P.

TITLE: One Class of Periodic Solutions in the Restricted Problem of Three Bodies

PERIODICAL: Astronomicheskiy zhurnal, 1961, Vol.38, No.2, pp.336-344

TEXT: The restricted circular problem of three bodies is considered without assuming that one of the finite masses is small. The problem is formulated as follows. Consider the mass points P_1 and P_2 having finite masses M_1 and M_2 and rotating with a constant angular velocity m in circular orbits about the centre of inertia. The motion is described in a right-handed rectangular set of coordinates OXYZ in which the origin coincides with the centre of mass of P_1 and P_2 and the motion takes place in the XY plane. The line P_1OP_2 is taken as the OX axis and the positive direction of the OY axis is chosen so that m is positive. The motion of a passively gravitating mass point P in the gravitational field of P_1 and P_2 is then described by the differential equations

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$$\begin{aligned} \frac{d^2X}{dt^2} - 2m\frac{dY}{dt} - m^2X &= \frac{\partial U}{\partial x}, \\ \frac{d^2Y}{dt^2} + 2m\frac{dX}{dt} - m^2Y &= \frac{\partial U}{\partial Y}, \\ \frac{d^2Z}{dt^2} &= \frac{\partial U}{\partial z}, \end{aligned} \tag{1}$$

where

$$U = \frac{fM_1}{R_1} + \frac{fM_2}{R_2}, \tag{2}$$

In these equations f is the gravitational constant, $R_1 = \sqrt{(X + a)^2 + Y^2 + Z^2}$, $R_2 = \sqrt{(X - b)^2 + Y^2 + Z^2}$ and a and b are the distances of P_1 and P_2 from the origin. Let R be the radius vector of P, then the force function U can be written down in the form

$$U = \frac{fM}{R}\left\{1 + \sum_{s=2}^{\infty} \frac{\tau_s}{R^s} \cdot P_s\left(\frac{X}{R}\right)\right\}, \tag{3}$$

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where $M = M_1 + M_2$, $P_s(X/R)$ are Legendre polynomials,

$$\gamma_s = \frac{ab}{a+b}(b^{s-1} + (-1)^s a^{s-1}). \qquad (4)$$

The series given by Eq.(3) is uniformly and absolutely convergent for all $R > R_0$ where $R_0 = \max\{a, b\}$. The coordinates and the time are then transformed by means of

$$X = \frac{x}{\alpha}, \; Y = \frac{y}{\alpha}, \; Z = \frac{z}{\alpha}, \; t = \frac{\tau}{\sqrt{fM\alpha^3}}, \qquad (5)$$

where α is a small parameter. Using the substitutions

$$\nu = \frac{m}{\sqrt{fM\alpha^3}}, \; \gamma_s = \frac{\bar{\gamma}_s}{\alpha}, \qquad (6)$$

where $\bar{\gamma}_s$ is a constant, the differential equations given by Eq.(1) assume the form

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on page 337 and 338 attached to ...

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$$\frac{d^2x}{d\tau^2} - 2\nu\frac{dy}{d\tau} - \nu^2 x = -\frac{x}{r^3} + \alpha\frac{\partial W}{\partial x},$$
$$\frac{d^2y}{d\tau^2} + 2\nu\frac{dx}{d\tau} - \nu^2 y = -\frac{y}{r^3} + \alpha\frac{\partial W}{\partial y}, \qquad (7)$$
$$\frac{d^2z}{d\tau^2} = -\frac{z}{r^3} + \alpha\frac{\partial W}{\partial z},$$

where
$$W = \sum_{s=2}^{\infty} \alpha^{s-2}\frac{\gamma_s}{r^{s+1}} \cdot P_s\left(\frac{z}{r}\right), \qquad (8)$$
причем $r = \sqrt{x^2+y^2+z^2}$.

and $r = \sqrt{x^2 + y^2 + z^2}$. The differential equations are then transformed by rotating the Oxyz set about the Oz axis through an angle $(\mu - \nu)\tau$ where μ is a constant. The new coordinates being indicated by the subscript 1. The new set of coordinates $Ox_1y_1z_1$ is then rotated through a constant angle i and the new coordinates are indicated by a bar above them. Finally, functions, ξ, η and ζ are introduced which are defined by

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$$\begin{aligned} \bar{x} &= (1+\xi)\cos\tau - \eta\sin\tau, \\ \bar{y} &= (1+\xi)\sin\tau + \eta\cos\tau, \\ \bar{z} &= \zeta. \end{aligned} \tag{11}$$

The result of this transformation is

$$\begin{aligned} &\eta'' + 2\xi' - \eta + 2\mu(-\eta\cos i + \xi'\cos i - \zeta'\sin i\cdot\sin\tau) - \\ &-\mu^2\left[-\frac{1}{2}\sin^2 i\cdot\sin 2\tau\cdot(1+\xi) + \frac{1}{2}(1+\cos^2 i - \sin^2 i\cdot\cos 2\tau)\eta - \right. \\ &\left. -\zeta\sin i\cdot\cos i\cdot\cos\tau\right] = -\frac{\eta}{r^3} + \alpha\frac{\partial W}{\partial\eta}, \\ &\zeta'' + 2\mu(\sin i\cdot\sin\tau + \xi\sin i\cdot\sin\tau + \eta\sin i\cdot\cos\tau - \\ &-\xi'\sin i\cdot\cos\tau + \eta'\sin i\cdot\sin\tau) + \mu^2(\sin i\cdot\cos i\cdot\sin\tau + \\ &+\xi\sin i\cdot\cos i\cdot\sin\tau + \eta\sin i\cdot\cos\tau - \zeta\sin^2 i) = -\frac{\zeta}{r^3} + \alpha\frac{\partial W}{\partial\zeta}, \end{aligned} \tag{12}$$

Eqs (11) and (12) are on page 338

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The equations of motion are then solved approximately by a power series method and a new class of spatial periodic solutions is established. The first few terms of the series are obtained. It is shown that the orbits which correspond to these solutions include both the attracting bodies. A peculiarity of the derived orbits is the fact that their nodes have a secular motion. If the set of coordinates $\overline{X}$, $\overline{Y}$, $\overline{Z}$ is employed, the coordinates being given by

$$\overline{X}=\frac{\bar{x}}{a},\quad \overline{Y}=\frac{\bar{y}}{a},\quad \overline{Z}=\frac{\bar{z}}{a},\quad \tau=\sqrt{fMa^{3}}\cdot t.$$

then the approximate periodic solutions are given by

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$$\overline{X} = \frac{1}{\alpha} \cdot \cos nt + \alpha \{p_{0,1} \cdot \cos nt + p_{0,3} \cos 3nt +$$
$$+ p_{2,-1} \cos(2\overline{v} - 1) nt + p_{2,1} \cos(2\overline{v} + 1) nt +$$
$$+ p_{2,-3} \cdot \cos(2\overline{v} - 3) nt + p_{2,3} \cdot \cos(2\overline{v} + 3) nt\},$$
$$\overline{Y} = \frac{1}{\alpha} \sin nt + \alpha \{q_{0,1} \cdot \sin nt + q_{0,3} \sin 3nt +$$
$$+ q_{2,-1} \cdot \sin(2\overline{v} - 1) nt + q_{2,1} \cdot \sin(2\overline{v} + 1) nt + q_{2,-3} \cdot \sin(2\overline{v} - 3) nt +$$
$$+ q_{2,3} \cdot \sin(2v + 3) nt\}, \tag{30}$$
$$\overline{Z} = \alpha \{r_{2,-1} \sin(2\overline{v} - 1) nt + r_{2,1} \cdot \sin(2\overline{v} + 1) nt\},$$

in which terms higher than first order terms in α are neglected and

$$p_{0,1} = \frac{\gamma_2}{32}(24 - 27 \sin^2 i) \quad p_{0,3} = \frac{3}{32} \gamma_2 \sin^2 i,$$

$$p_{2,-1} = \frac{\gamma_2}{16} \left\{ 9 \frac{\overline{v} + 1}{\overline{v}(4\overline{v}^2 - 1)} \sin^2 i + 3 \frac{(2\overline{v}^2 - 6\overline{v} + 1) \cos^4 \frac{i}{2}}{(\overline{v} - 1)^2 (4\overline{v}^2 - 8\overline{v} + 3)} \right\},$$

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$$p_{2,1} = \frac{\gamma_2}{16}\left\{9\frac{\bar{\nu}-1}{\bar{\nu}(4\bar{\nu}^2-1)}\sin^2 i + 3\frac{(2\bar{\nu}^2+6\bar{\nu}+1)\sin^4\frac{i}{2}}{(\bar{\nu}+1)^2(4\bar{\nu}^2+8\bar{\nu}+3)}\right\},$$

$$p_{2,-3} = \frac{3}{16}\gamma_2\frac{(10\bar{\nu}^2-10\bar{\nu}+3)\cos^4\frac{i}{2}}{(\bar{\nu}-1)^2(4\bar{\nu}^2-8\bar{\nu}+3)},$$

$$p_{2,3} = \frac{3}{16}\gamma_2\frac{(10\bar{\nu}^2+10\bar{\nu}+3)\sin^4\frac{i}{2}}{(\bar{\nu}+1)^2(4\bar{\nu}^2+8\bar{\nu}+3)},$$

$$q_{0,1} = \frac{\gamma_2}{32}(24-29\sin^2 i) \quad q_{0,2} = \frac{3}{32}\gamma_2\sin^2 i,$$

$$q_{2,-1} = -\frac{\gamma_2}{16}\left\{9\frac{\bar{\nu}+1}{\bar{\nu}(4\bar{\nu}^2-1)}\cdot\sin^2 i - 3\frac{(2\bar{\nu}^2-6\bar{\nu}+1)\cos^4\frac{i}{2}}{(\bar{\nu}-1)^2(4\bar{\nu}^2-8\bar{\nu}+3)}\right\},$$

$$q_{2,1} = \frac{\gamma_2}{16}\left\{9\frac{\bar{\nu}-1}{\bar{\nu}(4\bar{\nu}^2-1)}\cdot\sin^2 i - 3\frac{(2\bar{\nu}^2+6\bar{\nu}+1)\sin^4\frac{i}{2}}{(\bar{\nu}+1)^2(4\bar{\nu}^2+8\bar{\nu}+3)}\right\},$$

$$q_{2,-3} = -\frac{3}{16}\gamma_2\frac{(10\bar{\nu}^2-10\bar{\nu}+3)\cos^4\frac{i}{2}}{(\bar{\nu}-1)^2(4\bar{\nu}^2-8\bar{\nu}+3)},$$

$$q_{2,3} = \frac{3}{16}\gamma_2\frac{(10\bar{\nu}^2+10\bar{\nu}+3)\sin^4\frac{i}{2}}{(\bar{\nu}+1)^2(4\bar{\nu}^2+8\bar{\nu}+3)},$$

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There are 6 references: 2 Soviet and 4 non-Soviet.

ASSOCIATION: Gos. astronomicheskiy in-t im. P.K.Shternberga (State Astronomical Institute imeni P.K.Shternberg)

SUBMITTED: June 30, 1960

X

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24352
S/026/61/000/008/001/004
D051/D113

3,2300

AUTHORS: Aksenov, Ye.P., Grebenikov, Ye.A., and Demin, V.G.

TITLE: An outstanding scientific experiment. Celestial mechanics and the first manned space flight

PERIODICAL: Priroda, no. 8, 1961, 7-15

TEXT: The article deals with the launching, orbiting and landing of space ships, the instrumentation and conditions on board the Soviet-built "Vostok" space ship, and the creation of astronomical observatories outside the earth's atmosphere. Multi-stage rockets are said to be superior to single-stage ones because the thrust chambers can be separated from the rocket during flight. The authors give a detailed account of the general mechanics of orbital flight and refer, in particular, to the flight of the "Vostok" space ship. The "Vostok" moved along an elliptical orbit with a perigee of 181 km and an apogee of 327 km. It took 89.1 min to revolve round the earth and the eccentricity of the orbit was equal to approximately 0.01. The ship passed over the USSR at an altitude of 175 to 200 km and covered a total distance of a little less than 50,000 km. The cosmonaut could see the earth's surface in all directions at a distance of 1,500 - 1,800 km. All quantities character-

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An outstanding scientific experiment...

izing the orbit of a space ship are subject to change due to the non-spherical shape of the Earth and its varying internal density. Atmospheric resistance and the displacement of the orbital plane of the space ship due to differences in the earth's equatorial and polar radii must also be taken into consideration in order to guarantee the safe landing of the space ship. The authors discussed the difference between "hard" and "soft" landing. The former, which is due to high velocity of the space vehicle at the moment of its impact with the surface of a planet, results in the destruction of the space ship. The latter is used for space ships with cosmonauts, experimental animals etc. on board and is extremely difficult to accomplish if, as in the case of the "Vostok", the ship is to be landed in a pre-determined locality. "Soft" landing methods are based on the simultaneous application of celestial mechanics and the aerodynamics of supersonic speeds. After a certain amount of speed is lost through passing through the dense layers of the atmosphere, a further reduction in speed is realized by means of rocket braking systems and parachutes. The space ship enters the braking zone several thousand kilometers from the landing place, but the braking mechanisms are put into operation only after the position and the velocity of the space ship have been exactly determined. At this moment it must be oriented towards its center of mass in such a way that the nozzles of the thrust-chambers are in a suitable

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An outstanding scientific experiment...

function were normal. During the entire flight, the cosmonaut was in continuous communication with the Earth. The authors point to the new possibilities in astronomic research opened up by space flights and state that projects are at present being developed to establish astronomic observatories outside the earth's atmosphere. These observatories are to be installed either on large space stations moving along orbits near the Earth or on the Moon. There are 2 figures.

ASSOCIATION: Gosudarstvennyy astronomicheskiy institut im. P.K. Shternberga (State Astronomical Institute im. P.K. Shternberg)

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AKSENOV, Ye.P.; GREBENIKOV, Ye.A.; DEMIN, V.G.

Outstanding scientific experiment; celestial mechanics and the first space flight of man. Priroda 50 no.8:7-15 Ag '61. (MIRA 14:7)

1. Gosudarstvennyy astronomicheskiy institut im. P.K. Shternberga.
(Space flight)

AKSENOV, Ye.P.; GREBENIKOV, Ye.A.; DEMIN, V.G.; PIROGOV, Ye.N.

Some problems concerning the dynamics of flights to Venus. Soob. GAISH no.125:12-41 '62. (MIRA 16:3)
(Space flight to Venus)

AKSENOV, Ye.P.; GREBENIKOV, Ye.A.; DEMIN, V.G.

Polar orbits of artificial earth satellites. Vest. Mosk. un. Ser.3: Fiz., astr. 17 no.5:81-89 S-O '62. (MIRA 15:10)

1. Kafedra nebesnoy mekhaniki i gravimetrii Moskovskogo universiteta. (Artificial satellites)

2

AKSENOV, Ye. P., GREBENNIKOV, Ye. A. and DEMIN V. G.

"Generalized problem of two stationary centers"

Report presented at the Conference on Applied Stability-Of-Motion Theory and Analytical Mechanics, Kazan Aviation Institute, 6-8 December 1962

AKSENOV, Ye.P.; GREBENIKOV, Ye.A.; DEMIN, V.G.

Trajectories of the parabolic class in the problem of the motion of a material particle in a normal gravitation field of the earth. Soob. GAISH no.123:22-37 '62. (MIRA 17:2)

AKSENOV, Ye. P.,

"Motion of an artificial satellite in the earth's gravitational field"

repprt to be submitted for the 14th Congress Intl. Astronautics Federation, Paris, France, 25-Sep-1 Oct 1963

S/2560/63/000/016/0163/0172

ACCESSION NR: AT3006845

AUTHORS: Aksenov, Ye. P.; Grebenikov, Ye. A.; Demin, V. G.

TITLE: On the stability of some classes of orbits of artificial Earth satellites

SOURCE: AN SSSR. Iskusst. sputniki Zemli, no. 16, 1963, 163-172

TOPIC TAGS: satellite, Earth satellite, artificial satellite, artificial Earth satellite, stability, orbit stability, equatorial orbit, circular equatorial orbit, polar orbit, elliptical orbit, polar elliptical orbit, ellipsoidal orbit, hyperboloidal orbit, hyperbolic orbit

ABSTRACT: This theoretical paper issues from the authors' antecedent study, in the same series of booklets, no. 8, 1961, 64, in which the motion of artificial Earth (E) satellites (S) was examined in the normal gravitational field (NGF) of the E. The NGF, in the geocentric system of cylindrical coordinates, r, ϕ, z, the principal plane of which is assumed to be the equatorial plane of the E, and the z axis is the axis of rotation of the E, is expressed by the formula

$$U = \frac{fM}{2}\left\{\frac{1}{\sqrt{r^2+(z-ci)^2}} + \frac{1}{\sqrt{r^2+(z+ci)^2}}\right\}. \qquad (1)$$

ACCESSION NR: AT3006845

where f is the gravitational constant, M is the mass of the E, and c=210 km is a quantity determined by the flattening of the E. The present paper investigates the stability (in the sense of A. M. Lyapunov) of the particular solutions admitted by the differential equations of motion of this dynamic problem, also their stability under constantly acting perturbations (CAP) of a given form. These solutions, in particular, correspond to polar elliptical orbits, circular equatorial orbits, and periplegmatic orbits located on several ellipsoids, etc. The stability analyses set forth here comprise: (1) Stability of circular equatorial orbits (CEO); it is proved that CEO's are stable under CAP. In the potential of the NGF of the E, there are no longitudinal terms characteristic of triaxiality and also no terms that might be occasioned by asymmetries of the E relative to the equatorial plane. Harmonics of higher orders are also not fully considered. (2) Stability of ellipsoidal and polar elliptical orbits (PEO). It is demonstrated that the PEO's are stable with respect to the major semiaxis and the eccentricity of the ellipse. It is also found that for sufficiently small values of c_{10}, ellipsoidal orbits will also be stable in the Lyapunov sense relative to the major axis and the eccentricity of the ellipsoids along which the artificial S moves. (3) Stability of hyperboloidal and hyperbolic orbits (HHO). It is demonstrated that these orbits are stable with respect to the semiaxes of the hyperboloid along which the motion occurs and with respect to its eccentricity. Orig. art. has 61 numbered equations.

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AKSENOV, Ye.P.; GREBENIKOV, Ye.A.; DEMIN, V.G.

Qualitative analysis of the forms of motion in the problem of the motion of an artificial earth satellite in the normal field of the earth's attraction. Isk. sput. Zem. no.16:173-197 '63. (MIRA 16:6)

(Artificial satellites)

S/033/63/040/002/018/021
E001/E120

AUTHORS: Aksenov Ye.P., Grebenikov Ye.A., and Demin V.G.

TITLE: The generalized problem of two fixed centers and its application in the theory of motion of artificial earth satellites

PERIODICAL: Astronomicheskiy zhurnal, v.40, no.2, 1963, 363-372

TEXT: The classical problem of two fixed centers consists in a study of the motion of a passively gravitating material point subjected to attraction by two fixed material points P_1 and P_2. In the present paper this problem is investigated in application to the motion of artificial satellites. The potential U in the problem under consideration can be presented, if inverse distances r_1 and r_2 are expanded in series in Legendre polynomials, in the form:

$$U = \frac{fM}{r}\left\{1 + \sum_{n=0}^{\infty} \frac{\gamma_n}{r^n} P_n\left(\frac{z}{r}\right)\right\} \tag{4}$$

where M is mass of both fixed bodies and $\gamma_n = \dfrac{M_1 a_1^n + M_2 a_2^n}{M}$;

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n is integer. The authors formulate conditions under which the expression for the potential should be real, although other quantities may be complex ones. On the other hand, the gravitational potential of the Earth is expressed, in the geocentric equatorial system of coordinates, as follows:

$$V = \frac{fM}{r}\left\{1 + \sum_{k=2}^{\infty} I_k \left(\frac{R}{r}\right)^k P_k\left(\frac{z}{2}\right)\right\} \qquad (21)$$

It is shown that expression (4) can represent, under certain conditions, the gravitational potential of the Earth, and potentials proposed by M.D. Kislik and J.P. Vinti are particular cases of the generalized problem of two fixed centers. Using generalized coordinates u, v, w, differential equations of Lagrange of the second kind are written in the form:

$$\frac{d}{dt}(I\dot{u}) + \left[\dot{u}^2 + \dot{v}^2 - \dot{w}^2 \operatorname{ch}^2 v\right] \sin u \cos u = \frac{1}{c^2}\frac{\partial U}{\partial u};$$

$$\frac{d}{dt}(I\dot{v}) - \left[\dot{u}^2 + \dot{v}^2 + \dot{w}^2 \sin^2 u\right] \operatorname{sh} v \operatorname{ch} v = \frac{1}{c^2}\frac{\partial U}{\partial v}; \qquad (36)$$

$$\frac{d}{dt}\left[\dot{w}\, ch^2 v \sin^2 u\right] = 0.$$

The system of equations (36) has integrals of energy and area. Introducing new variables $\lambda = sh\, v$ and $\mu = \cos u$, the following expressions for the coordinates of a satellite in the rectangular system are derived:

$$x = c\sqrt{(1+\lambda^2)(1-\mu^2)}\cos w;$$

$$y = c\sqrt{(1+\lambda^2)(1-\mu^2)}\sin w;$$

$$z = c\sigma + c\lambda\mu.$$

There is 1 table.

ASSOCIATION: Gos. astronomicheskiy in-t im. P.K. Shternberga (State Astronomical Institute imeni P.K. Shternberg)

SUBMITTED: January 25, 1962

ACCESSION NR: AP4026229 S/0293/64/002/001/0003/0013

AUTHOR: Aksenov, Ye. P.

TITLE: Intermediate artificial earth satellite orbits

SOURCE: Kosmicheskiye Issledovaniya, v. 2, no. 1, 1964, 3-13

TOPIC TAGS: artificial satellite, artificial satellite orbit, artificial satellite intermediate orbit, artificial satellite orbital eccentricity

ABSTRACT: Expressions are derived for the coordinates of a satellite in the form of elliptical functions of some intermediate variable and a relationship is established between this variable and time. The problem considered involves the motion of an artificial satellite under the condition that the potential of the earth's gravity is replaced by the force function of the generalized problem of two fixed centers. The force function of this problem approximates the earth's gravity potential with an accuracy to terms of the second order of magnitude relative to the earth's flattening. Conical coordinates are expanded into trigonometric series which converge for all moments of time. The resulting expansions are correct for any values of quasi-eccentricity $e < 1$. All terms are retained whose amplitudes are not less than 10^{-8}. The numerical computations and working formulas representing the satellite coordinates are considered to be quite concise and suitable for practical computations. Orig. art. has: 50 formulas.

Card 1/2

ACCESSION NR: AP4026230 S/0293/64/002/001/0014/0022

AUTHOR: Aksenov, Ye. P.

TITLE: Intermediate artificial earth satellite orbits with low eccentricity

SOURCE: Kosmicheskiye issledovaniya, v. 2, no. 1, 1964, 14-22

TOPIC TAGS: earth satellite, artificial satellite, artificial satellite coordinates, artificial satellite orbit, orbital eccentricity, artificial satellite intermediate orbit, gravity field, gravity potential, Keplerian motion

ABSTRACT: An analysis is made of intermediate artificial earth satellite orbits, the satellite coordinates being expanded for the positive powers of some small parameter. These expansions converge for all moments of time and are correct for all eccentricity values less than 0.2. All terms are retained to the second degree of flattening, inclusive, but only the so-called normal gravity field is taken into account. Numerical computations show that the resulting working formulas, respresenting the satellite coordinates, are concise and convenient to use. A relation is formulated, similar to the center equation in the theory of Keplerian motion, between some intermediate variable (through which the satellite coordinates are expressed) and time. The derived relation, in the case of arbitrary eccentricities, is somewhat unwieldy. The article does not consider the problem of conver-

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ACCESSION NR: AP4026230

gence of expansions for powers of eccentricity, but this problem is of theoretical rather than practical interest. The series given for $\varepsilon = 0$ (where ε is the small parameter mentioned) become the well-known series of unperturbed motion which converge when $e < 0.662743$. The derived intermediate orbit has two important properties: a) it rigorously takes into account the most significant terms in the earth's gravity potential; and b) it is quite simple to use. Orig. art. has: 28 formulas.

ASSOCIATION: none

SUBMITTED: 15Mar63 DATE ACQ: 16Apr64 ENCL: 00

SUB CODE: AS NO REF SOV: 002 OTHER: 000

Card 2/2

ACCESSION NR: AT4035346 S/2623/62/000/123/0022/0037

AUTHOR: Aksenov, Ye. P.; Grebenikov, Ye. A.; Demin, V. G.

TITLE: Trajectories of a parabolic class in the problem of motion of a material particle in the earth's normal gravitational field

SOURCE: Moscow. Universitet. Gosudarstvennyy astronomicheskiy institut. Soobshcheniya, no. 123, 1962, 22-37

TOPIC TAGS: artificial satellite, artificial satellite orbit, artificial satellite orbital element, artificial satellite parabolic orbit, normal gravitational field

ABSTRACT: This article discusses the motion of a material particle in the earth's normal gravitational field. The normal gravitational field is determined by the potential of two attracting fixed centers situated at some apparent distance from one another. The authors give the results of a qualitative analysis of the equations of motion for a case when the total mechanical energy is equal to zero. It is shown that there are five types of motion. Parametric orbital equations are derived for each of these types. The paper is divided into 7 parts: 1 - Investigation of the elliptical coordinate μ; 2 - Investigation of the elliptical coordinate σ; 3 - formulas for the coordinate w; 4 - Relationship between time t and the regularizing variable τ; 5 - Polar trajectories of the class h = 0; 6 - Equ-

ACCESSION NR: AT4035346

atorial orbits of the class h = 0; 7 - Summary of the formulas for the five types of motion. It is concluded that motion in all the types of the parabolic class occurs in unlimited trajectories in an infinite period of time. Orig. art. has: 73 formulas.

ASSOCIATION: Gosudarstvennyky astronomicheskiy institut Moskovskogo universiteta (State Astronomical Institute of Moscow University)

SUBMITTED: 00 DATE ACQ: 26May64 ENCL: 00

SUB CODE: AA, SV NO REF SOV: 003 OTHER: 001

Card 2/2

AKSENOV, Ye.P.

Intermediate orbits of artificial earth satellites. Kosm. issl. 2 no.1:3-13 Ja-F '64.

Intermediate orbits of artificial earth satellites with small eccentricities. Ibid.:14-22

(MIRA 17:4)

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000100720009-2"

... approximation method,

... Equations are derived to describe the ...

APPROVED FOR RELEASE: 06/05/2000 CIA-RDP86-00513R000100720009-2"

L 61000-65

ACCESSION NR: AP[illegible]

L 19388-66 EWT(1)/EWP(m)/T GW

ACCESSION NR: AP5015836 UR/0030/65/000/006/0114/0116

23
8
B

AUTHOR: Aksenov, Ye. P. (Candidate of physico-mathematical sciences)

TITLE: Conference on celestial mechanics

SOURCE: AN SSSR. Vestnik, no. 6, 1965, 114-116

TOPIC TAGS: astronomic conference, astronautic conference, celestial mechanics, solar system

ABSTRACT: The Commissions on Celestial Mechanics, Stellar and Nebular Physics, and Stellar Astronomy of the Astronomical Council of the Academy of Sciences USSR held their regular meetings in Kiev, 25-27 January 1965. Most of the reports read dealt with theoretical problems and questions concerned with the construction of analytical theories of the major planets. The problem of the convergence of methods (chiefly, the Delaunay and Newcomb methods) permitting a formal solution of differential equations in a purely trigonometric form received prime attention. The convergence of the Newcomb method for most initial conditions was proved earlier by V. I.

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ACCESSION NR: AP5015836

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Arnol'd. However, the Newcomb method is only suitable in the case of the absence of commensurability, while the Delaunay method can be used without restrictions. In his discussion of the convergence of the Delaunay method, G. A. Merman (Institute of Theoretical Astronomy) came to a conclusion similar to that of Arnol'd relative to the Newcomb method. L. Yu. Pius (Institute of Theoretical Astronomy) investigated a nonautonomous case with one degree of freedom and found the limits of the region in which the trajectory will be almost periodic and, consequently, stable as defined by Lagrange.

Data obtained on the interval of change of a variable action can be applied to Schwarzschild orbits in a restricted three-body problem. V. G. Demin (Patrice Lumumba University) used Arnol'd's findings to investigate the stability of several types of trajectories in a restricted three-body problem. Problems dealing with methods of averaging were discussed by V. I. Arnol'd (Moscow University), Ye. A. Grebenikov (Patrice Lumumba University), and V. M. Volosov (Moscow University). M. S. Petrovskaya (Institute of Theoretical Astronomy) and R. A. Lyakh (Leningrad University) discussed perturbing functions. In his report on the motion of planets around

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the sun, V. M. Alekseyev (Moscow University) concluded that the planets begin to interact with each other when the distance between them is of the order of their masses. Sh. G. Sharaf (Institute of Theoretical Astronomy) discussed the theory of motion of Pluto. Because of recent developments in astronautics, the report of V. A. Brumberg (Institute of Theoretical Astronomy), which contained two new methods of constructing a planetary theory in a purely trigonometric form, aroused great interest. He proceeded from two premises: first, that the creation of such a theory is not feasible without modern computers, and, second, that rectangular coordinates are preferable to the elements. One of the proposed methods is based on the application of the Hill-Brown lunar method to planetary problems. The other consists in the substitution of formal series in the equation of motion as well as obtaining and solving infinite nonlinear algebraic systems for coefficients and arguments. At the conclusion of the meeting it was decided to hold a conference on questions of celestial mechanics and astronautics in Leningrad in May 1966.

Card 3/4

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ACCESSION NR: AP5015836

O

ASSOCIATION: none

SUBMITTED: 00 ENCL: 00 SUB CODE: AA, GO

NR REF SOV: 000 OTHER: 000 FSB v. 1, no. 8

LJC
Card 4/4

L 01850-67 EWT(1)/EWP(m) GW
ACC NR: AR6021904 SOURCE CODE: UR/0313/66/000/003/0021/0021

18
17
B

AUTHOR: Aksenov, Ye. P.

TITLE: Motion of artificial satellites in the Earth's normal gravitation field

SOURCE: Ref. zh. Issl kosm prostr. Abs. 3.62.195

REF SOURCE: Soobshch. Gos. astron. in-ta im. P. K. Shternberga, no. 137, 1965, 3-45

TOPIC TAGS: two fixed center problem, artificial satellite motion, satellite orbit theory

ABSTRACT: A detailed study is made of the possibility of using an exact general solution of the generalized two-fixed-center problem to represent intermediate orbits, for deriving analytical theories of motion for AES (artificial Earth satellites). Although a final form is obtained for this general solution, some of the formulas utilized are quite complex, so that its use in the closed form results in considerable mathematical difficulties. It is therefore proposed to expand satellite coordinates into convergent series in powers of the small parameter ϵ which enters into formulas for the solution of the generalized two-fixed-center

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L 03850-67

ACC NR: AR6021904

problem. This parameter is determined by the initial conditions of motion a, e, which represent generalizations of Keppler's large half axis and eccentricity, as well as the modulus of the imaginary distance between the fixed centers of gravity $c \approx 210$ km, in accordance with the formula

$$\varepsilon = c/a(1-e).$$

In the case of AES (with e < 1), ε is always smaller than 1/30. Thus a solution for the conic coordinates of a satellite is given in trigonometric form, taking into account terms up to the fourth order of magnitude relative to and inclusive of ε, and retaining all terms up to the third order of magnitude relative to the compression of the Earth. The theory developed illustrates an example of a hypothetic AES with orbit parameters a = 8498.0 km, e = 0.184, i = 22°51', which correspond approximately to the parameters of the orbit of Vanguard II. A cited example demonstrates the sufficient brevity of the formulas for mathematical computations. There are 16 bibliographic references. [Translation of abstract] [SP]

SUB CODE: 22/

Card 2/2 LC

AKSENOV, Ye.P., kand.fiz.-matem.nauk; IVANOV, V.V., kand.fiz.-matem.nauk; PAVLOVSKAYA, Ye.D., kand.fiz.-matem.nauk

In the Astronomical council; conferences of commissions. Vest.AN SSSR 35 no.6:114-118 Je '65. (MIRA 18:8)

ACC NR: AR6020753 SOURCE CODE: UR/0269/66/000/003/0012/0012

AUTHOR: Aksenov, Ye. P.

TITLE: Motion of artificial satellites in the normal gravitational field of Earth

SOURCE: Ref. zh. Astronomiya, Abs. 3.51.106

REF SOURCE: Soobshch. Gos. astron. in-ta im. P. K. Shternberga, no. 137, 1965, 3-45

TOPIC TAGS: satellite motion, artificial earth satellite, earth gravity

ABSTRACT: This is a comprehensive study of the possibility of using the strictly valid universal solution of a generalized problem of two fixed centers as the intermediary orbits during the plotting of analytical theories on the motion of various satellites. Although the universal solution is given in the final form, nevertheless some of its formulas are so complex that in practice the use of the original formulas results in considerable mathematical difficulties. It was decided, therefore, to expand the satellite coordinates into converging series according to the series expansion parameter ε, obtaining formulas for the solution of problems of two fixed centers. This parameter is controlled by the initial conditions of motion a, e, which are the generalizations of Kepler's large semiaxis and eccentricity, and also by the modulus of apparent distance between fixed centers of gravitation $c \approx 210$ km, according to the formula $\varepsilon = c/a(1 - e)$. If the satellite is moving, then we always have $\varepsilon < 1/30$

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ACC NR: AR6020753

(where $e<1$). Hence, solutions for the conic coordinates of the satellite were presented in the trigonometric form with consideration for the members of up to the fourth order included with respect to ε. All members of the third order with respect to the Earth's compression were retained. The theory was illustrated by using as an example a hypothetical satellite with orbital elements $a = 8498.0$ km, $e = 0.184$, and $i = 32°51'$, corresponding approximately to the orbital elements of the Vanguard II satellite. The example leads to a conclusion on the conciseness of the obtained formulas that is sufficient for numerical calculations. Bibliography of 16 titles. B. G. [Translation of abstract]

SUB CODE: 22, 03

Card 2/2

MOCHANOV, P.; AKSENOV, Yu., inzh. sluzhby sudovogo khozyaystva

New propeller system for motor-tugboats. Mor. flot 23 no.1: 25-27 Ja '63. (MIRA 16:4)

1. Glavnyy inzh. Astrakhanskogo upravleniya Kaspiyskogo parokhodstva (for Mochanov).
(Tugboats) (Propellers)

LEVIN, M.I.; GUSHCHA, L.A.; AL'TMAN, K.Z., starshiy inzh.; PESIN, I.Ya.; AKSENOVA, A.F.

New reagents for feltwork. Tekst.prom. 21 no.12:48-50 D '61. (MIRA 15:2)

1. Nachal'nik otdela valyal'no voylochnykh izdeliy Rosglavlegsnabsbytsyr'ye pri Vserossiyskom sovete narodnogo khozyaystva (for Levin). 2. Glavnyy inzh. TSentral'noy nauchno-issledovatel'skoy laboratorii khlopka i shersti Mosgorsovnarkhoza (for Gushcha). 3. TSentral'naya nauchno-issledovatel'skaya laboratoriya khlopka i shersti Mosgorsovnarkhoza (for Al'tman). 4. Glavnyy inzh. fabriki "Tekhvoylok" (for Pesin). 5. Zaveduyushchiy laboratoriyey fabriki "Tekhvoylok" (for Aksenova).

(Feltwork)
(Ammonium sulfate)

AKSENOVA, A. K.; IGNATOV, M. G.; EPSHTEYN, P. V.

1. Secondary operations in injuries of the peripheral nerves. Vopr. neirokhir 15 no. 3:36-44 May-June 1951. (CIML 21:3)

1. Of the Institute of Neurosurgery imeni Academician N. N. Burdenko (Director — Prof. B. G. Yegorov, Corresponding Member of the Academy of Medical Sciences), Academy of Medical Sciences USSR.

ARSENOVA, A.K.

Pathologic data on the problem of repeated surgery on the peripheral nerves. Vopr. neirokhir. 17 no.6 16-22 Nov-Dec 1953. (CIML 25:5)

1. Of the Institute of Neurosurgery imeni Academician N.N. Burdenko of the Academy of Medical Sciences USSR.

AKSENOVA, A.K.; IGNATOV, M.G., professor.

Late surgical intervention in wounds of the peripheral nerves. Vopr.neirokhir. 18 no.1:81-87 Ja-F '54. (MLRA 7:4)

1. Iz Instituta neyrokhirurgii im. akademika N.N.Burdenko Akademii meditsinskikh nauk SSSR.

(Nerves--Wounds and injuries)

AKSENOVA, A.T.

BENEDIKTOV, I.A., redaktor; GRITSENKO, A.V., redaktor; IL'IN, M.A., zamestitel' glavnogo redaktora, LAPTEV, I.D., LISKUN, Ye.F.; LOBANOV, P.P., glavnyy redaktor; LYSENKO, T.D.; SKRYABIN, K.I.; STOLETOV, V.N.; PAVLOV, G.I., kandidat sel'skokhozyaystvennykh nauk, nauchnyy redaktor; SOKOLOV, N.S., professor, nauchnyy redaktor; ANTIPOV-KARATAYEV, I.N., doktor sel'skokhozyaystvennykh nauk, nauchnyy redaktor; KARPINSKIY, N.P., kandidat sel'skokhozyaystvennykh nauk, nauchnyy redaktor; SHESTAKOV, A.G., doktor sel'skokhozyaystvennykh nauk, professor, nauchnyy redaktor; RUBIN, B.A., doktor sel'skokhozyaystvennykh nauk, nauchnyy redaktor; KOMARNITSKIY, N.A., dotsent, nauchnyy redaktor; LYSENKO, T.D., akademik, nauchnyy redaktor; POLYAKOV, I.M., professor, nauchnyy redaktor; SHCHEGOLEV, V.N., doktor sel'skokhozyaystvennykh nauk, professor, nauchnyy redaktor; YAKUSHKIN, I.V., akademik, nauchnyy redaktor; LARIN, I.V., professor, doktor biologicheskikh nauk, nauchnyy redaktor; SMELOV, S.P., professor, doktor biologicheskiy nauk, nauchnyy redaktor; EDEL'SHTEYN, V.I., professor, doktor sel'skokhozyaystvennykh nauk, nauchnyy redaktor; SHCHERBACHEV, D.M., professor, doktor meditsinskikh nauk, nauchnyy redaktor; OGOLEVETS, G.S., kandidat sel'skokhozyaystvennykh nauk, nauchnyy redaktor; YAKOVLEV, P.N., akademik, naychnyy redaktor; YEKIMOV, V.P., agronom, nauchnyy redaktor [deceased], EYTINGEN, G.P., professor, doktor sel'skokhozyaystvennykh nauk, nauchnyy redaktor; TIMOFEYEV, N.N., professor, nauchnyy redaktor; TUROV, S.I., professor, doktor biologicheskikh nauk; YUDIN, V.M., akademik, nauchnyy redaktor; LISKUN, Ye.F., akademik, nauchnyy redaktor; VITT, V.O., professor, doktor sel'skokhozyaystvennykh nauk, nauchnyy redaktor; KALININ, V.I., kandidat sel'skokhozyaystvennykh nauk, nauchnyy redaktor;

(Continued on next card)

BENEDIKTOV, I.A.--- (continued) Card 2.

GREBEN', L.K., akademik, nauchnyy redaktor; NIKOLAYEV, A.I., professor, doktor sel'skokhozyaystvennykh nauk, nauchnyy redaktor; RED'KIN, A.P., professor, doktor sel'skokhozyaystvennykh nauk, nauchnyy redaktor; SMETNEV, S.I., professor, doktor sel'skokhozyaystvennykh nauk, nauchnyy redaktor; POPOV, I.S., professor, doktor sel'skokhozyaystvennykh nauk, nauchnyy redaktor; MANTEYFEL', P.A., professor nauchnyy redaktor; INIKHOV, G.S., professor, doktor khimicheskikh nauk, nauchnyy redaktor; ANFIMOV, A.N., professor, nauchnyy redaktor; GUBIN, A.F., professor, doktor sel'skokhozyaystvennykh nauk, nauchnyy redaktor; POLTEV, V.I., professor, doktor veterinarnykh nauk, nauchnyy redaktor; LINDE, V.V., professor, doktor tekhnicheskikh nauk, nauchnyy redaktor; CHERGAS, B.I., professor, doktor biologicheskikh nauk, nauchnyy redaktor; NIKOL'SKIY, G.V., professor, nauchnyy redaktor; AVTOKRATOV, D.M., professor, doktor veterinarnykh nauk, nauchnyy redaktor; IVANOV, S.V., professor, doktor biologicheskikh nauk, nauchnyy redaktor; VIKTOROV, K.P., professor, doktor veterinarnykh nauk, nauchnyy redaktor; KOLYAKOV, Ya.Ye., professor, doktor veterinarnykh nauk, nauchnyy redaktor; ANTIPIN, D.N., professor, doktor veterinarnykh nauk, nauchnyy redaktpr; MARKOV, A.A., professor, doktor veterinarnykh nauk, nauchnyy redaktor; DOMRACHEV, G.V., professor, doktor veterinarnykh nauk, nauchnyy redaktor; OLIVKOV, B.M., professor, doktor veterinarnykh nauk nauchnyy redaktor [deceased]; FLEGMATOV, N.A., professor, doktor veterinarnykh nauk, nauchnyy redaktor;BOLTINSKIY, V.N., professor, doktor tekhnicheskikh nauk, nauchnyy redaktor; VIL'YAMS, Vl.P., professor, doktor tekhnicheskikh nauk, nauchnyy redaktor; KRASNOV, V.S., kandidat tekhnicheskikh nauk, nauchnyy redaktor;

(Continued on next card)

BENEDIKTOV, I.A.---(continued) Card 3.

YEVREINOV, M.G., akademik, nauchnyy redaktor; SAZONOV, N.A., doktor tekhnicheskikh nauk, nauchnyy redaktor; NIKANDROV, B.I., inzhener, nauchnyy redaktor; KOSTYAKOV, A.N., akademik, nauchnyy redaktor; CHERKASOV, A.A., professor, doktor tekhnicheskikh nauk, nauchnyy redaktor; DAVITAYA, F.F., doktor sel'skokhozyaystvennykh nauk, nauchnyy redaktor; IVANOV, N.N., professor, doktor tekhnicheskikh nauk, nauchnyy redaktor; ORLOV, P.M., professor, doktor tekhnicheskikh nauk, nauchnyy redaktor, LOZA, G.M., kandidat ekonomicheskikh nauk, nauchnyy redaktor; CHERNOV, A.V., kontrol'nyy redaktor; ZAVARSKIY, A.I., redaktor; ROSSOSHANSKAYA, V.A., redaktor; FILATOVA, N.I., redaktor; YEMEL'YANOVA, N.I., redaktor; SILIN, V.S., redaktor BRANZBURG, A.Yu., redaktor; MAGNITSKIY, A.V., redaktor terminov; KUDRYAVTSEVA, A.G., redaktor terminov; AKSENOVA, A.P., mladshiy redaktor; MALYAVSKAYA, O.A., mladshiy redaktor; FEDOTOVA, A.F., tekhnicheskiy redaktor

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